Evaluators & Assessors Capacity Building Training Series for
Engineering Education Accreditation
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Introduction to Engineering Education Accreditation

Prof. Dr. Hla Myo Tun
Pro-Rector (Research)
Yangon Technological University
hmt.ytu@gmail.com

Outline

- UN SDGs
- Goal No (4)
- Traditional Education
- Enhancement of Engineering Higher Education in Myanmar
- Outcome-based Education
- Engineering Education Accreditation

UN SDGs

- The 2030 Agenda for Sustainable Development calls on countries to begin efforts to achieve the 17 SDGs over the next 15 years.
- The goals address the needs of people in both developed and developing countries, emphasizing that no one should be left behind.
- ***The mobilization of means of implementation, including financial resources, technology development and transfer and capacity-building, as well as the role of partnerships, are also acknowledged as critical.***

https://www.un.org/sustainabledevelopment/blog/2015/12/sustainable-development-goals-kick-off-with-start-of-new-year/

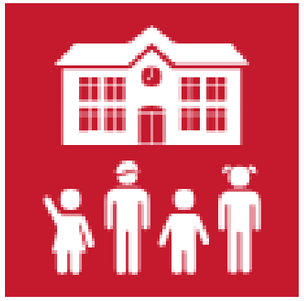
Goal No (4) Quality Education

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

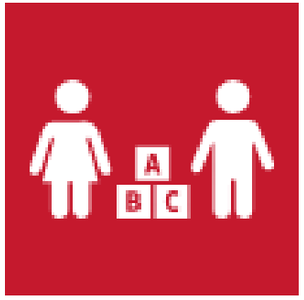
အားလုံးပါဝင်ပြီး သာတူညီမျှသော အရည်အသွေးရှိသည့် ပညာရေးကို အာမခံပြီး အားလုံးအတွက် တစ်သက်တာသင်ယူမှုအခွင့်အလမ်းများကို မြှင့်တင်ပါ။

https://www.globalgoals.org/goals/4-quality-education/

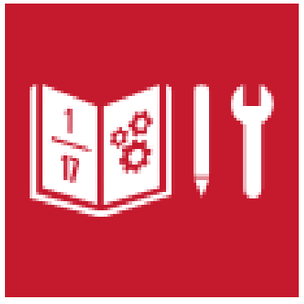
The Targets



4.1. Free Primary and Secondary Education
By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.



4.2. Equal Access to Quality Pre-primary Education
By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education.



4.3. Equal Access to Affordable Technical, Vocational and Higher Education
By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.

https://www.globalgoals.org/goals/4-quality-education/

The Targets (Continued.,)

4.4. Increase the Number of People with Relevant Skills for Financial Success
By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

4.5. Eliminate All Discrimination in Education
By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations.

4.6. Universal Literacy and Numeracy
By 2030, ensure that all youth and A substantial proportion of adults, both men and women, achieve literacy and numeracy.

https://www.globalgoals.org/goals/4-quality-education/

The Targets (Continued.,)

4.7. Education for Sustainable Development and Global Citizenship

By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

4.8. Build and Upgrade Inclusive and Safe Schools

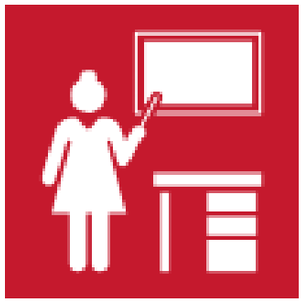
Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all.

4.9. Expand Higher Education Scholarships For Developing Countries

By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing states and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries.

https://www.globalgoals.org/goals/4-quality-education/

The Targets (Continued.,)



4.A. Increase the Supply of Qualified Teachers in Developing Countries
By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States.

Everyone can help to make sure that we meet the Global Goals. Use these ten targets to create action to ensure quality education.

ကျွန်ုပ်တို့သည် ကမ္ဘာလုံးဆိုင်ရာ ရည်မှန်းချက်များ ပြည့်မီကြောင်း သေချာစေရန် လူတိုင်းက ကူညီနိုင်ပါသည်။ အရည်အသွေးရှိသော ပညာရေးကို သေချာစေရန် လုပ်ဆောင်ချက်ဖန်တီးရန် ဤရည်မှန်းချက်ဆယ်ခုကို အသုံးပြုပါ။

https://www.globalgoals.org/goals/4-quality-education/

Traditional Education

- The traditional education system is characterized by a structured, teacher-centered approach.
- Classes are typically held in physical classrooms, with teachers delivering lectures and students taking notes.
- The curriculum is standardized, and assessment is often based on written exams and rote memorization.

https://helendoron.at/six-reasons-traditional-teaching-methods-fail-2/

Enhancement of Engineering Higher Education in Myanmar (EEHE)

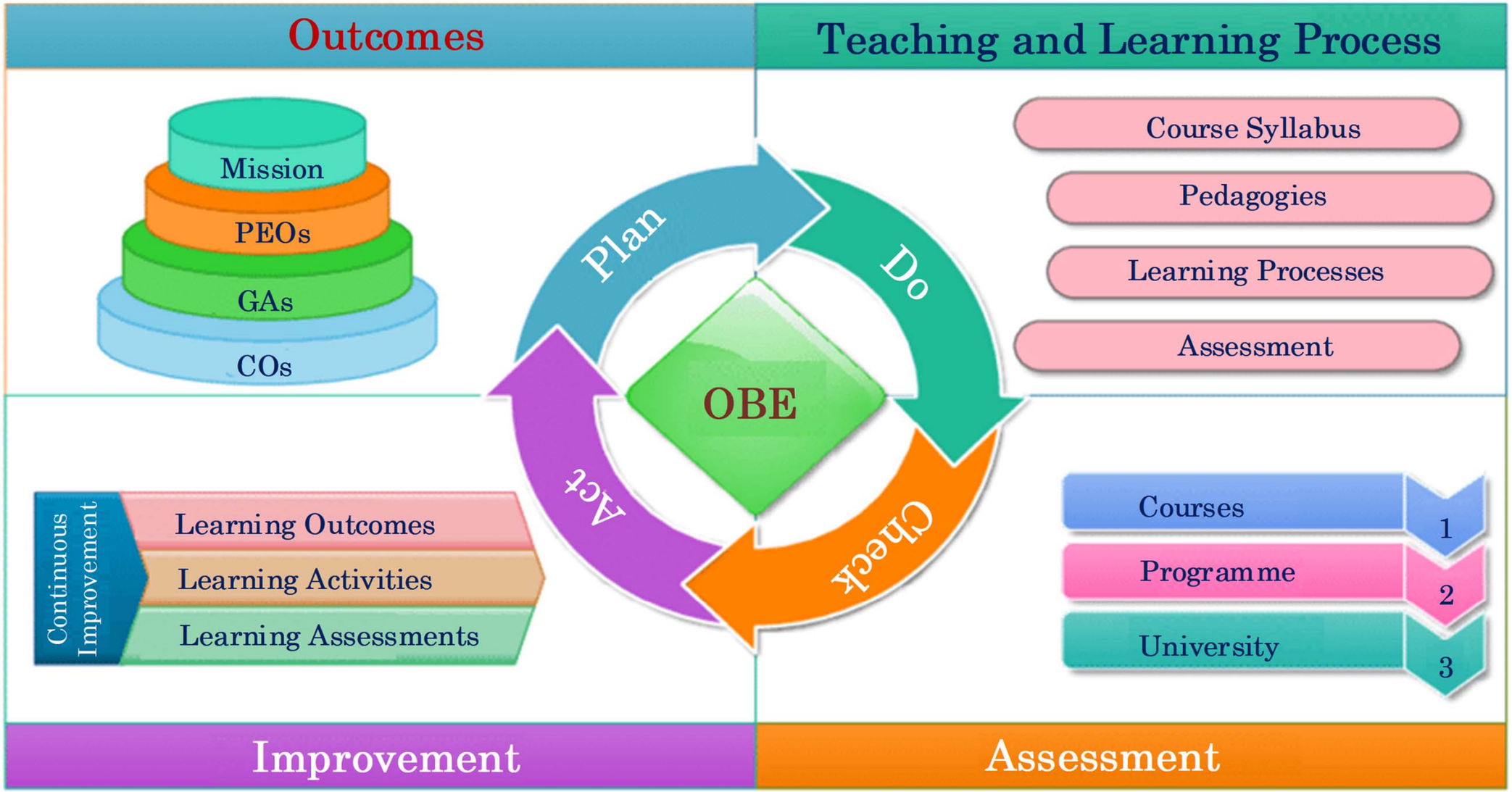
The Project for Enhancement of Engineering Higher Education in Myanmar (EEHE) by Government of Japan

Activity Description

- To enhance quality of undergraduate education program and research capacity of mainly the target departments of YTU and MTU by
  - (1) enhancing research capacity of academic staff through doctoral degree acquisition and implementation of joint research projects;
  - (2) improving course works of COE-BE program with more practice and experiments;
  - (3) enhancing academic system and teaching method of academic staff to conduct practice-oriented education.

https://www.jica.go.jp/Resource/myanmar/english/office/topics/press191226.html

Outcome-based Education



https://www.researchgate.net/figure/Outcome-based-education-OBE-framework-consistency-with-PDCAPlan-Do-Check-Act-principle_fig1_328233416?__cf_chl_tk=hHSfgsNU3NMuTO242ob.wdyayz1xx7yoNRFMfsd.0VY-1724835265-0.0.1.1-9406

Components of OBE

https://www.mastersofterp.com/blog/importance-of-outcome-based-education-in-modern-education.aspx

Definition of OBE

- *Outcome-based Education (OBE) focuses on results rather than learning processes.*
- *It aims to achieve the specified and desired outcomes.*

https://www.google.com/url?sa=i&url=https%3A%2F%2Fahaslides.com%2Fblog%2Foutcome-based-education%2F&psig=AOvVaw2awz5JyUwEZo_gjlsoQ_H8&ust=1724921765281000&source=images&cd=vfe&opi=89978449&ved=2ahUKEwjRuvm5qJeIAxUYT2wGHbraDCAQjRx6BAgAEBg

Outcome Based Education vs Traditional Education

Outcome Based Education	Traditional Education
Focuses on practical skills, competencies, and real-world applications.	Emphasizes the transfer of content knowledge.
Tends to engage students more actively in their learning process.	Relies more on passive learning
Promotes critical thinking and problem-solving skills	Lean more toward theoretical understanding than practical application.
Is inherently flexible and adaptable to changes in industries and societal needs.	May emphasize established knowledge rather than current trends.

https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.linkedin.com%2Fpulse%2Fprocess-driven-outcome-based-education-myth-vs-indian-ranjit-goswami&psig=AOvVaw3O_0w9NOrO3Nq8sKEapgla&ust=1724921849761000&source=images&cd=vfe&opi=89978449&ved=0CBcQjhxqFwoTCPir1euol4gDFQAAAAAdAAAAABAE

Basic Principles of Outcome Based Education

- **Clarity of focus:** In an OBE system, educators and learners have a shared understanding of what needs to be achieved. Learning objectives are explicit and measurable, enabling everyone to align their efforts toward specific goals.
- **Designing back:** Instead of starting with content and activities, educators begin by identifying the desired outcomes and then design the curriculum to achieve those outcomes.
- **High expectations**: This principle is rooted in the belief that learners are capable of reaching remarkable levels of competence when provided with the right support and challenges.
- **Expanded opportunities:** This inclusivity ensures that all learners can thrive and succeed if they are given appropriate opportunities—what really matters is what they learn, the importance, regardless of the particular learning method.

https://www.hkmu.edu.hk/alto/best-practices-in-teaching-learning-and-technology/implementing-outcome-based-education/

Objectives of The OBE Approach

- **Course Outcomes (COs):** They help instructors design effective teaching strategies, assessments, and learning activities that align with the intended outcomes of the course.
- **Program Outcomes (POs)/ Graduate Attributes (GAs):** They should encompass the cumulative learning from multiple courses within the program.
- **Program Educational Objectives (PEOs):** They often reflect the institution's mission and its commitment to preparing graduates for success in the workforce and society.
- **Global Opportunities for Students:** This objective encourages educational institutions to provide students with opportunities for cross-cultural experiences, international collaborations, and exposure to diverse perspectives.

https://www.hkmu.edu.hk/alto/best-practices-in-teaching-learning-and-technology/implementing-outcome-based-education/

OBE in Practice

- The first step in an outcome-based approach involves setting clear and appropriate learning outcomes for any programme, course, or even learning material.
- Learning outcomes are statements of what students should be able to achieve at the end of the specified programme or course of study.
- All teaching, learning and assessment activities need to be aligned with these intended learning outcomes.
- This is known as the principle of constructive alignment.

https://www.hkmu.edu.hk/alto/best-practices-in-teaching-learning-and-technology/implementing-outcome-based-education/

Writing Learning Outcomes

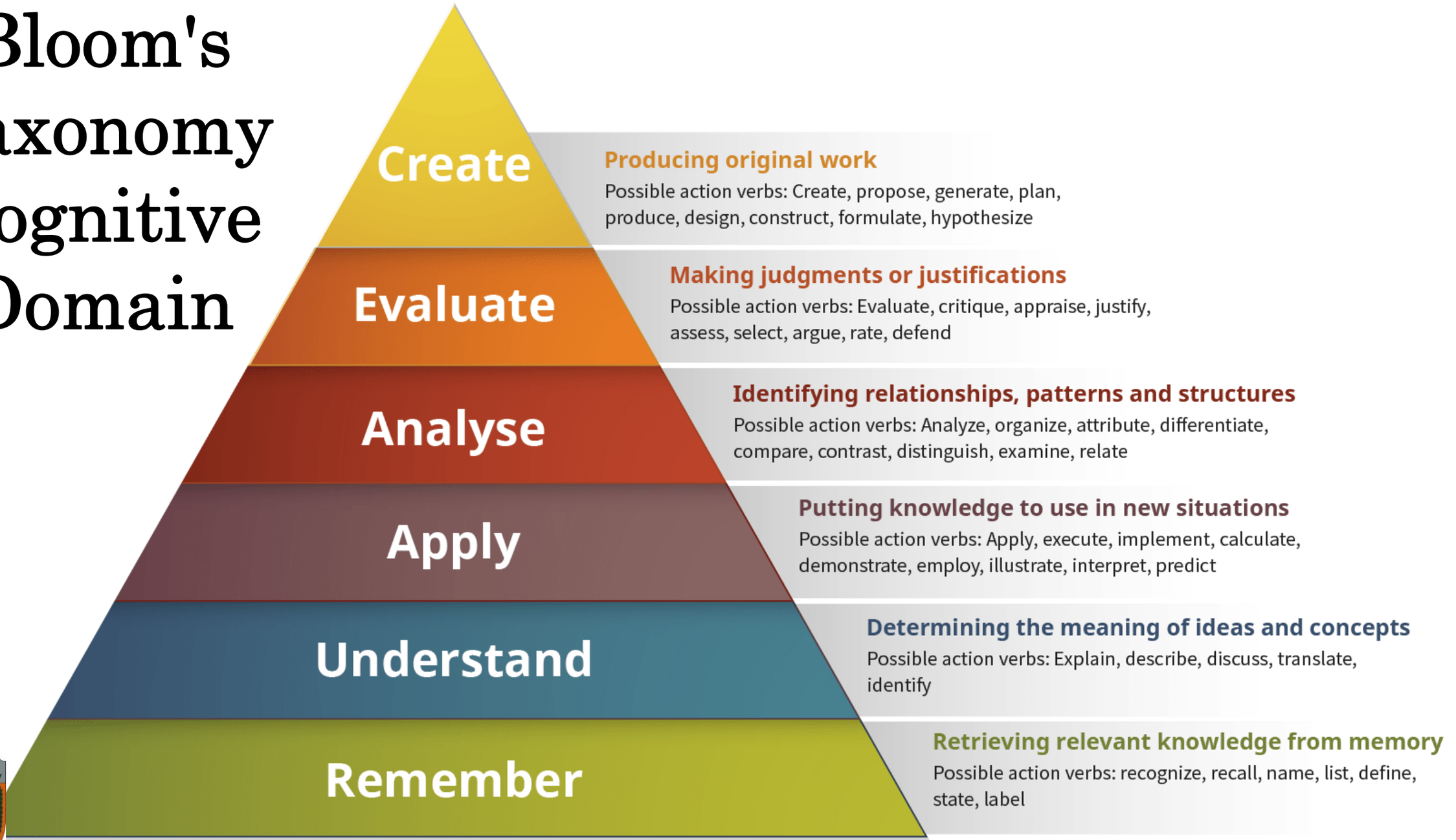
Bloom's Taxonomy: Cognitive domain

- The intended learning outcomes for both programmes and courses need to be stated clearly in operational terms using action verbs.
- The action verb should indicate an outcome that can be demonstrated by the student, e.g. Explain the core theories and concepts in sociology and apply them to the Myanmar context.
- Bloom's taxonomy, a framework developed in 1956 by Benjamin Bloom and colleagues, categorized educational goals on six levels, from simple to complex.
- The model was further revised in 2001. It remains a popular and useful tool to support teachers in writing learning outcomes and considering the level of teaching and learning activities.

https://www.hkmu.edu.hk/alto/best-practices-in-teaching-learning-and-technology/implementing-outcome-based-education/

Sources:
Armstrong, P (2010) 'Bloom's Taxonomy', Vanderbilt University Center for Teaching, https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/.
Krathwohl, David R (2002) 'A Revision of Bloom's Taxonomy: An Overview', Theory into Practice, 41(4), 212–218.

Bloom's Taxonomy Cognitive Domain



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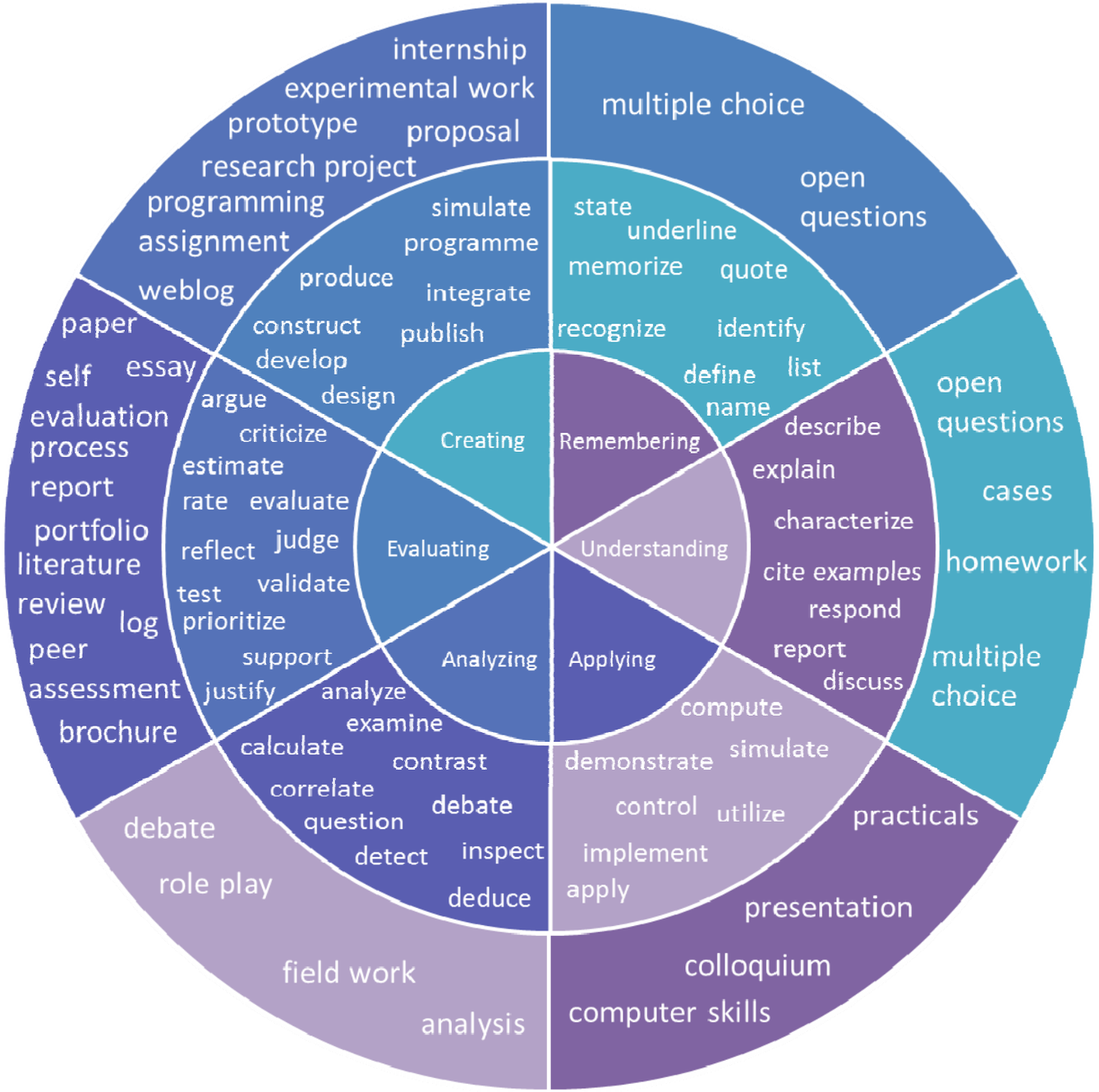
Bloom's taxonomy Verb Circle Wheel



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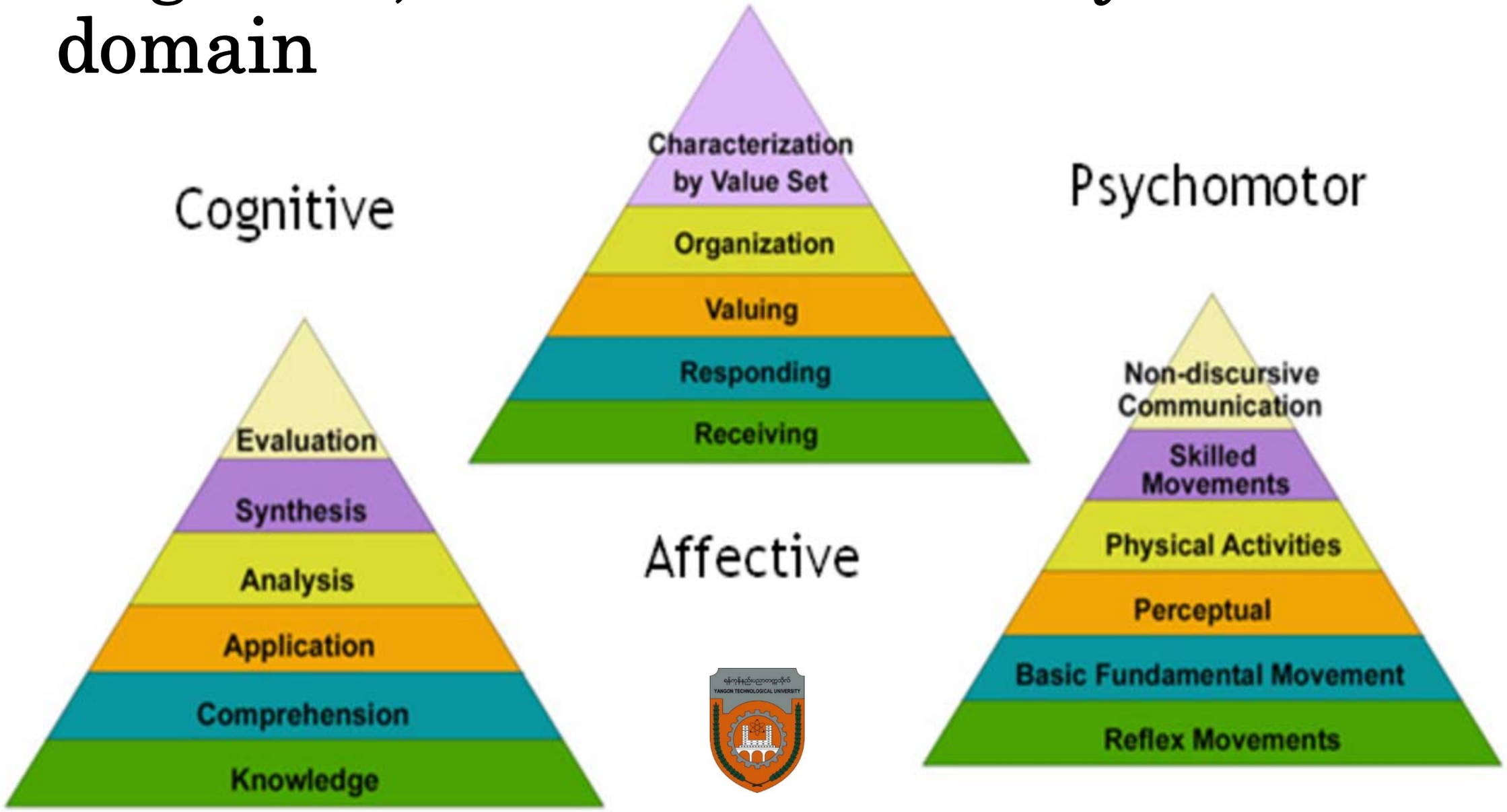
Cognitive, Affective and Psychomotor domain



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Affective Domain of Learning Krathwohl's Taxonomy

- Krathwohl's affective domain taxonomy is perhaps the best known of any of the affective taxonomies.
- The affective domain focuses on the attitudes, values, interests, and appreciation of learners.
- This domain includes the manner in which individuals deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes.

*https://educarepk.com/affective-domain-krathwohls-taxonomy.html?_gl=1*1dz419u*_ga*MTA4OTk2MDMyMC4xNzI0NTA2OTgx*_ga_1408K3ZX26*MTcyNDUwNjk4MS4xLjAuMTcyNDUwNjk4MS42MC4wLjA.*

Levels of Affective Domain of Learning

1. Receiving: Key Words (Verbs) — *Asks, Chooses, Shows willingness, Describes, Follows, Pays attention, Holds, Identifies, Locates, Names, Points to, Selects, Sits attentively.*
2. Responding: Key Words (Verbs) — *Answers, Replies, Responds, Assists, Complies, Conforms, Discusses, Greets, Helps, Labels, Performs, Practices, Presents, Reads, Recites, Tells, Reports, Selects, Writes.*
3. Valuing: Key Words (Verbs) — *Completes, Describes, Differentiates, Explains, Follows, Forms, Initiates, Invites, Joins, Justifies, Proposes, Reads, Reports, Shares, Studies, Works.*
4. Organizing: Key Words (Verbs) — *Adheres, Alters, Arranges, Combines, Compares, Completes, Defends, Explains, Generalizes, Identifies, Integrates, Modifies, Orders, Organizes, Prepares, Relates, Synthesizes.*
5. Characterization by Value or Value-Set: Key Words (Verbs) — *Acts, Discriminates, Displays, Influences, Listens, Modifies, Performs, Practices, Proposes, Qualifies, Questions, Revises, Serves, Solves, Uses, Verifies.*

https://educarepk.com/affective-domain-krathwohls-taxonomy.html?_gl=1*1dz419u*_ga*MTA4OTk2MDMyMC4xNzI0NTA2OTgx*_ga_1408K3ZX26*MTcyNDUwNjk4MS4xLjAuMTcyNDUwNjk4MS42MC4wLjA.

Psychomotor Domain of Learning Simpson's Taxonomy

- Harrow's taxonomy (1972) of psychomotor domain focuses on the development of physical fitness, dexterity, agility, and body control to achieve a high level of expertise.
- Harrow's taxonomy is organized according to the degree of coordination including involuntary responses and learned capabilities.

*https://educarepk.com/affective-domain-krathwohls-taxonomy.html?_gl=1*1dz419u*_ga*MTA4OTk2MDMyMC4xNzI0NTA2OTgx*_ga_1408K3ZX26*MTcyNDUwNjk4MS4xLjAuMTcyNDUwNjk4MS42MC4wLjA.*

Levels of Psychomotor Domain of Learning

1. Reflex Movements: Key Words (Verbs) — *To flex, to stretch, to straighten, to extend, to inhibit, to lengthen, to shorten, to tense, to stiffen, to relax.*
2. Fundamental Movements: Key Words (Verbs) — *To crawl, to creep, to slide, to walk, to jump, to run, to grasp, to reach, to tighten, to support, to handle.*
3. Perceptual Abilities: Key Words (Verbs) — *To catch, to bounce, to eat, to write, to balance, to bend, to draw from memory, to distinguish by touching, to explore*
4. Physical Abilities: Key Words (Verbs) — *To endure, to improve, to increase, to stop, to start, to move precisely, to touch, to bend.*
5. Skilled Movements: Key Words (Verbs) — *To waltz, to type, to play the piano, to plane, to file, to skate, to juggle, to paint, to dive, to fence, to golf, to change.*
6. Non-discursive Communication: Key Words (Verbs) — *To gesture, to stand, to sit, to express facially, to dance skillfully, to perform skillfully, to paint skillfully, to play skillfully.*

*https://educarepk.com/affective-domain-krathwohls-taxonomy.html?_gl=1*1dz419u*_ga*MTA4OTk2MDMyMC4xNzI0NTA2OTgx*_ga_1408K3ZX26*MTcyNDUwNjk4MS4xLjAuMTcyNDUwNjk4MS42MC4wLjA.*

Engineering Education Accreditation

Reference Documents

INTERNATIONAL ENGINEERING ALLIANCE

IEA Constituent Agreements

Washington Accord	International Professional Engineers Agreement
Sydney Accord	International Engineering Technologists Agreement
Dublin Accord	APEC Engineer Agreement
	Agreement for International Engineering Technicians

Graduate Attributes and Professional Competences

Approved Version 4: 21 June 2021

This document is available through the IEA website: http://www.ieagreements.org

International Engineering Alliance (IEA)

http://www.ieagreements.org

- Washington Accord for Engineers (WA)-1989
- Sydney Accord for Engineering Technologists (SA)-2001
- Dublin Accord for Engineering Technicians (DA)-2002
- International Professional Engineers Agreement (IPEA)-1997
- APEC Engineer Agreement-2000
- International Engineering Technologists Agreement (IETA)-2001
- Agreement for International Engineering Technicians(AIET)-2015

Graduate Attributes

Professional Competences

Engineering Graduates & Professionals

Corresponding Attributes & Competences

Engineers Complex Engineering Problems & Activities	WA IPEA
Engineering Technologists Broadly-defined Engineering Problems& Activities	SA IETA
Engineering Technicians Well-defined Engineering Problems& Activities	DA AIET

Depth of Knowledge Required @ IEA

Washington Accord (WA) Complex Problems	Sydney Accord (SA) Broadly Defined Problems	Dublin Accord (DA) Well defined Problems
Requires research-based knowledge much of which is at, or informed by, the forefront of the professional discipline and which allows a fundamentals-based, first principles analytical approach	Requires knowledge of principles and applied procedures or methodologies	Can be solved using limited knowledge, but normally requires extensive practical knowledge

Programme Education Objectives

What is expected a few years (say 5 years) graduation (What the programme prepares graduates in their career and professional accomplishments)

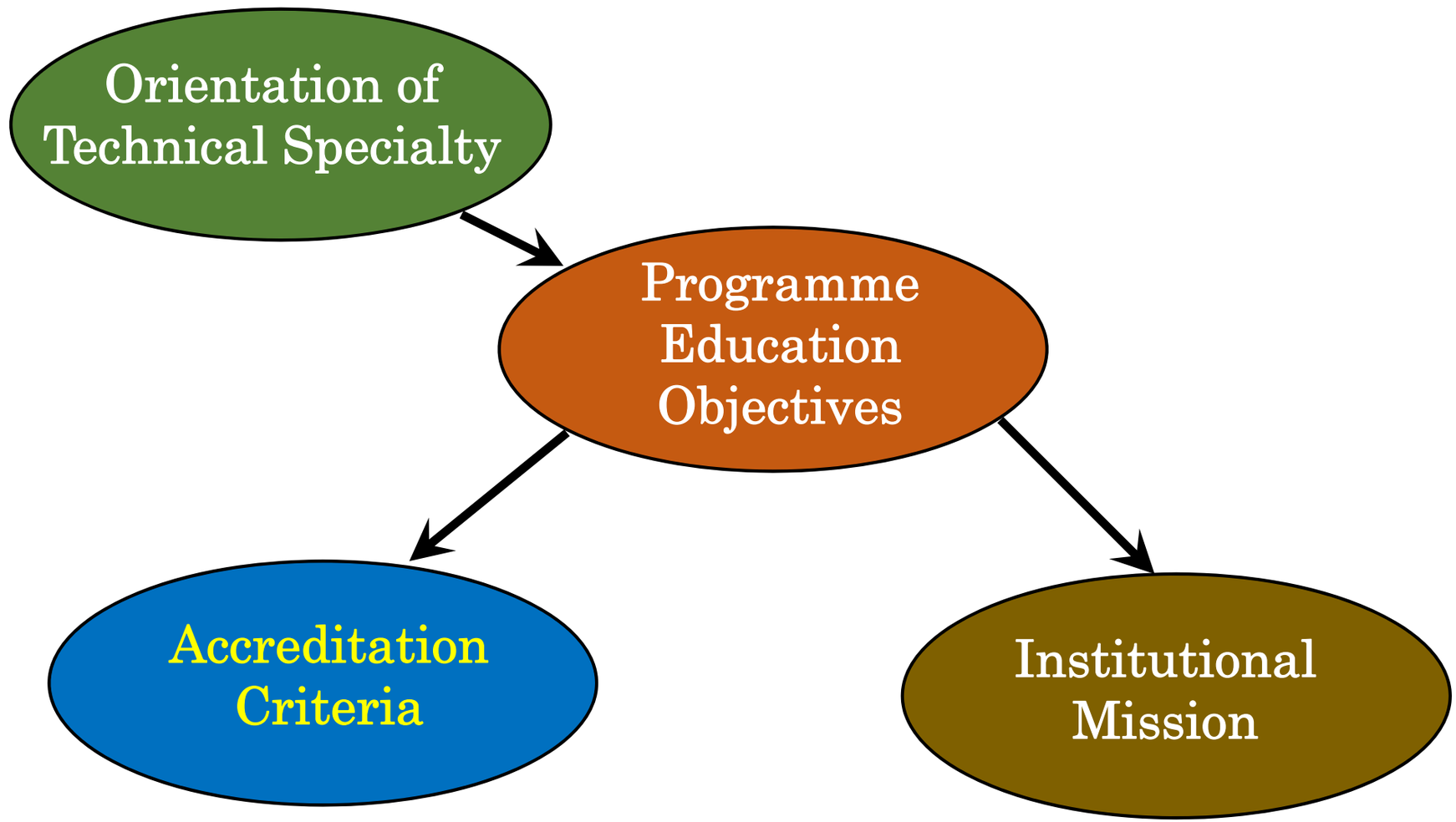
Characteristics of Good Programme Education Objectives (PEO) Statements

- Each addresses one or more needs of one or more stakeholders
- Consistent with the mission & vision of the institution
- Expectation by stakeholder addressed
- Number of statements should be limited and manageable
- Should not be simply restatement of outcomes
- Forward looking and challenging

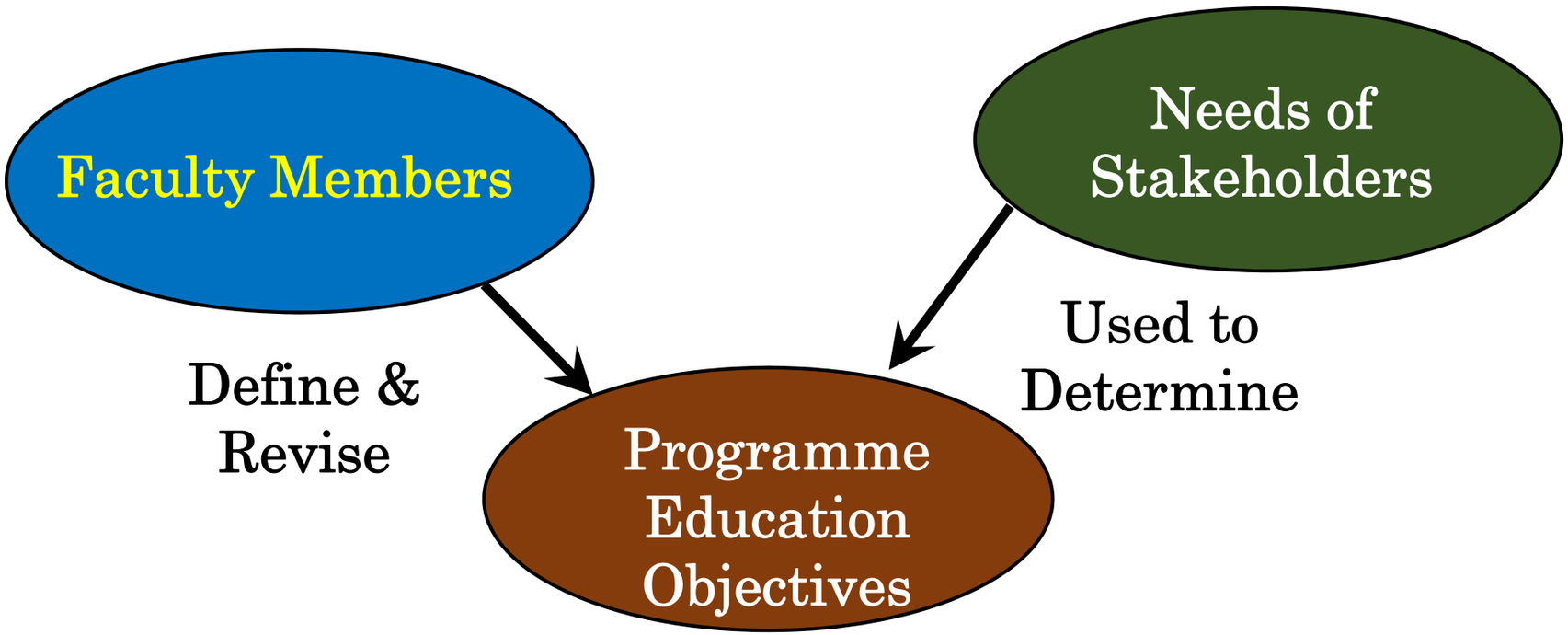
Continued.,

- Should be stated such that a graduate can demonstrate in their career or professional life after graduation (long term in nature)
- Distinctive/unique features/having own niche
- Specific, Measurable, Achievable, Realistic, and having a Time frame (SMART)
- Clear, concise, consistent and reachable
- Has clear link to the programme outcomes & curriculum design
- Reviewed, revised & updated continually
- Publicised & published

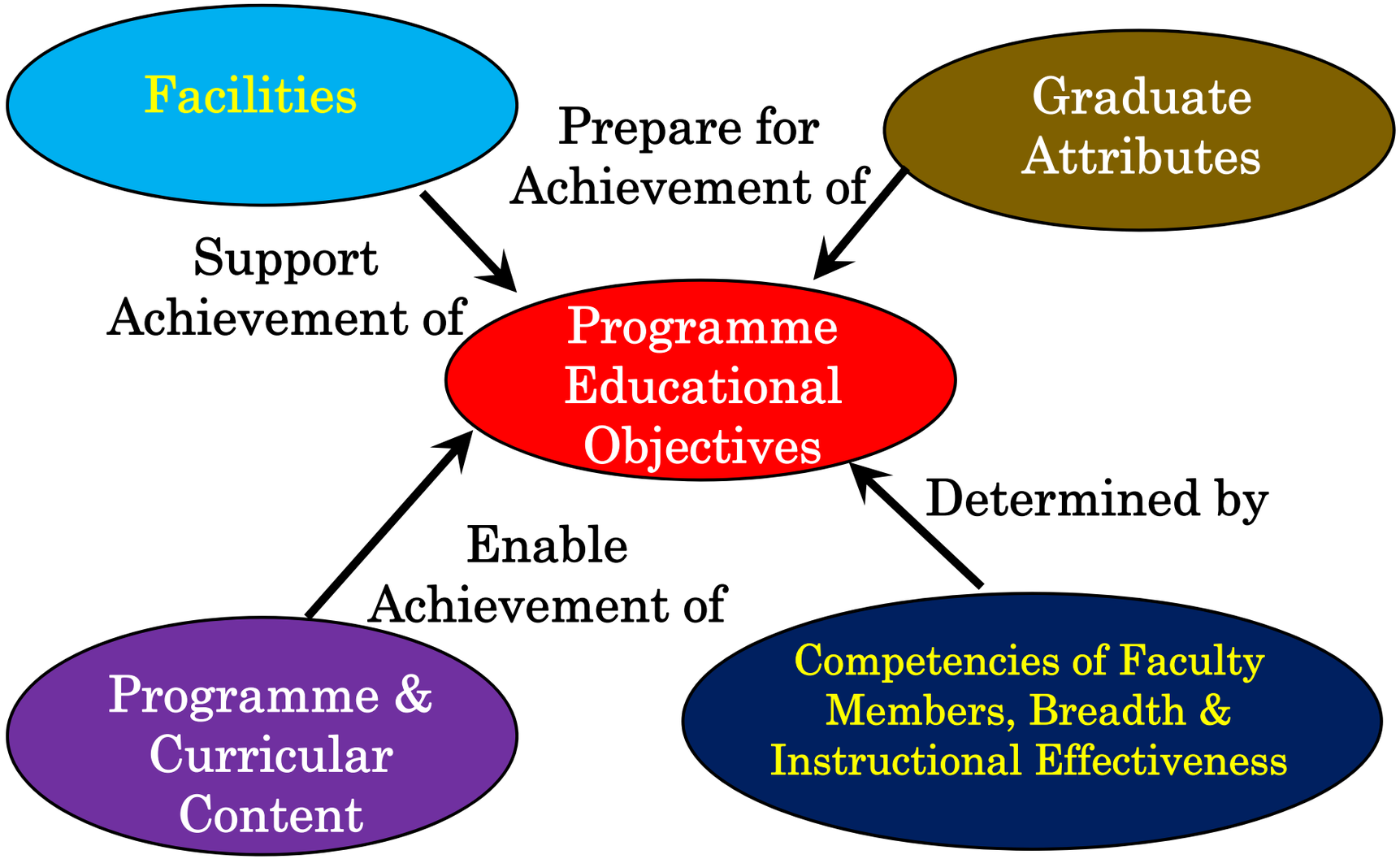
Characteristics of Programme Education Objectives



Development of Programme Education Objectives



Programme Education Objectives



Example of Programme Education Objectives

BEng (Hons) Electrical and Electronic Engineering is to produce:

- PEO 1: Graduates competent in practising fundamental scientific and engineering principles in E&E engineering in a creative and innovative manner
- PEO 2: Graduates capable of communicating and managing effectively in diverse areas of E&E
- PEO 3: Graduates practising professional ethics, life-long learning, and sustainable development for the betterment of the profession and society

Graduate Attributes (GAs) or Program Outcomes (POs)

- **(i) Engineering Knowledge** - Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialisation as specified in WK1 to WK4 respectively to the solution of complex engineering problems;
- **(ii) Problem Analysis** - Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences (WK1 to WK4);
- **(iii) Design/Development of Solutions** - Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (WK5);
- **(iv) Investigation** – Conduct investigation of complex engineering problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;
- **(v) Modern Tool Usage** - Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations (WK6);
- **(vi) The Engineer and Society** - Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems (WK7);
- **(vii) Environment and Sustainability** - Understand and evaluate the sustainability and impact of professional engineering work in the solutions of complex engineering problems in societal and environmental contexts. (WK7);
- **(viii) Ethics** - Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice (WK7);
- **(ix) Individual and Team Work** - Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings;
- **(x) Communication** - Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;
- **(xi) Project Management and Finance** - Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments;
- **(xii) Life Long Learning** - Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Engineering Knowledge

Differentiation Characteristic	WA	SA	DA
Breadth and depth of education and type of knowledge, both Theoretical and Practical	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialisation to the solution of complex engineering problems;	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to defined and applied engineering procedures, processes, system or methodologies.	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to wide practical procedures and practices.

Problem Analysis

Differentiation Characteristic	WA	SA	DA
Complexity of analysis	Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences;	Identify, formulate, research literature and solve broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialisation.	Identify and solve well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity.

Design/Development of Solutions

Differentiation Characteristic	WA	SA	DA
Breadth and uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified or codified	Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, society, and environmental considerations;	Design solutions for broadly-defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.	Design solutions for well-defined technical problems and assist with the design of system, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

Investigation

Differentiation Characteristic	WA	SA	DA
Breadth and depth of investigation and experimentation	Conduct investigation into complex problems using research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;	Conduct investigation of broadly-defined problems; locate, search and select relevant data from codes, data bases and literature, design and conduct experiments to provide valid conclusions.	Conduct investigation of well-defined problems; locate and search relevant codes and catalogue, conduct standard tests and measurements.

Modern Tool Usage

Differentiating Characteristic : Level of Understanding of the Appropriateness of the Tool

Engineer-Washington Accord	Engineering Technologist – Sydney Accord	Engineering Technician-Dublin Accord
Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations;	Select and apply appropriate techniques, resources, and modern engineering tools, including prediction and modelling, to broadly defined engineering activities, with an understanding of the limitations	Apply appropriate techniques, resources, and modern engineering tools to well-defined engineering activities, with an awareness of the limitations

The Engineer and Society

Differentiation Characteristic	WA	SA	DA
Level of knowledge and responsibility	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice; Demonstrate understand of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.	Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice.	Demonstrate knowledge of societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice.

Environment and Sustainability

Differentiation Characteristic	WA	SA	DA
No differentiation in this characteristics	Understand the impact of professional engineering solutions in environmental contexts and demonstrate knowledge of and need for sustainable development	Understand the impact of engineering solutions in a societal context and demonstrate knowledge of and need for sustainable development.	Understand the impact of engineering solutions in a societal context and demonstrate knowledge of and need for sustainable development.

Ethics
Differentiating Characteristic : None

Engineer-Washington Accord	Engineering Technologist – Sydney Accord	Engineering Technician-Dublin Accord
Apply ethnical principles and commit to professional ethics and responsibilities and norms of engineering practices; Understand and commit to professional ethics, responsibilities, and norms of engineering practices	Understand and commit to professional ethics, responsibilities and norms of engineering practice	Understand and commit to professional ethics, responsibilities, and norms of engineering practice

Communication

Differentiation Characteristic	WA	SA	DA
Level of Communication according to type of activities performed	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instruction;	Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions	Communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions

Individual and Teamwork

Differentiation Characteristic	WA	SA	DA
Role in and diversity of team	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings;	Function effectively as an individual, and as a member or leader in diverse technical teams.	Function effectively as an individual, and as a member in diverse technical teams.

Life Long Learning

Differentiation Characteristic	WA	SA	DA
No differentiation in this characteristics	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadcast context of technological change.	Recognize the need for, and have the ability to engage in independent and life-long learning.	Recognize the need for, and have the ability to engage in independent and life-long learning.

Project Management and Finance

Differentiation Characteristic	WA	SA	DA
Level of management required for differing types types of activity	Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments; Demonstrate a knowledge and understanding of management and business practices, such as risk and change management, and understand their limitations.	Demonstrate an awareness and understanding of management and business practices, such as risk and change management, and understand their limitations.	Demonstrate an awareness of management and business practices, such as risk and change management.

Creating a Course

Planning

- Identifying course content and defining measureable learning outcomes

Instruction

- Select and implement methods – deliver the specified content and facilitate student achievement of the outcomes

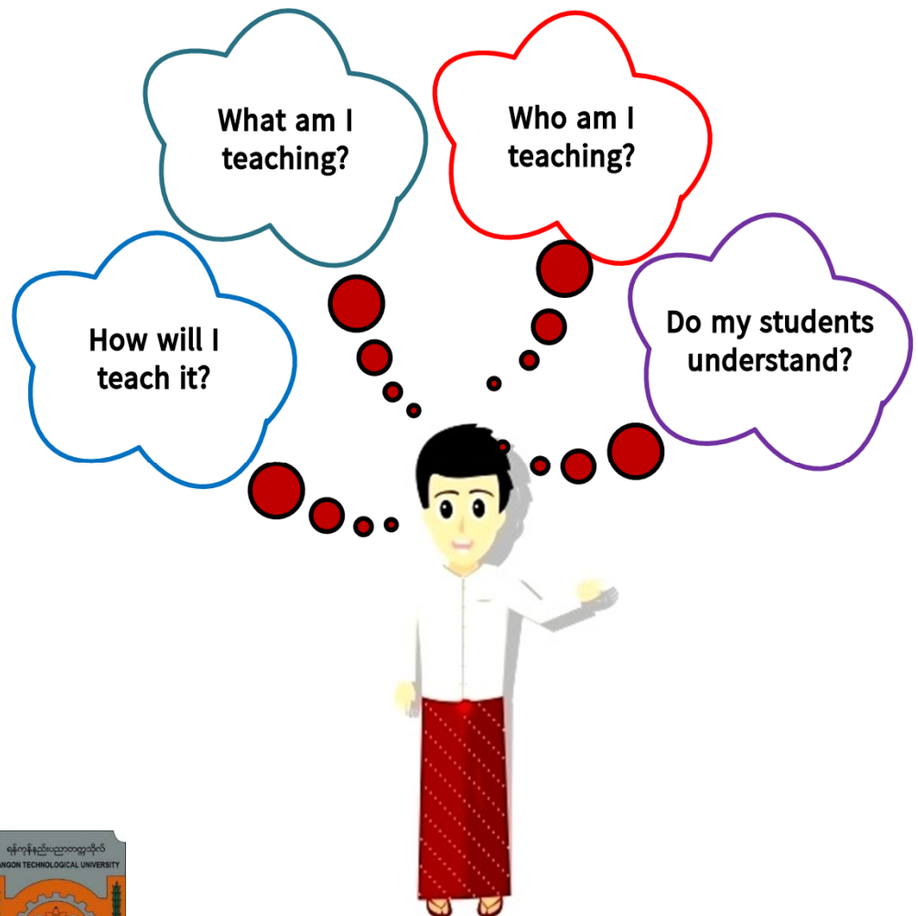
Assessment and Evaluation

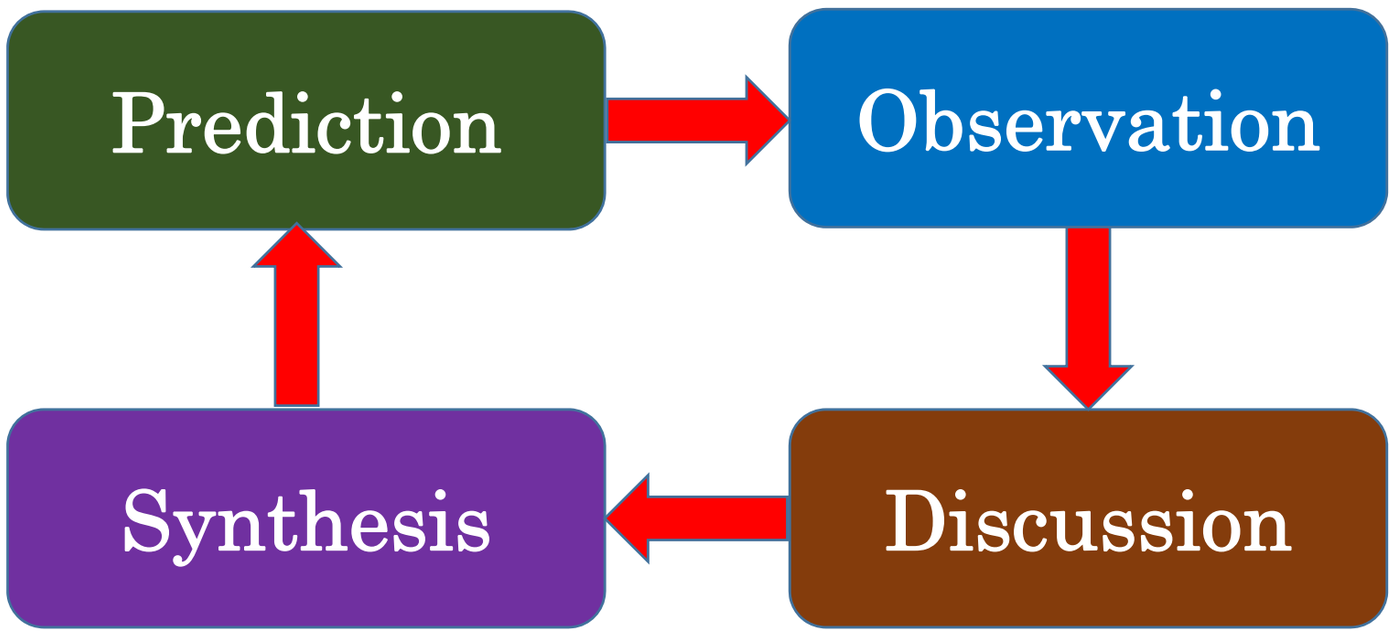
- Select and implement methods – determine how well the outcomes have been achieved

Writing the Clear Course Outcomes

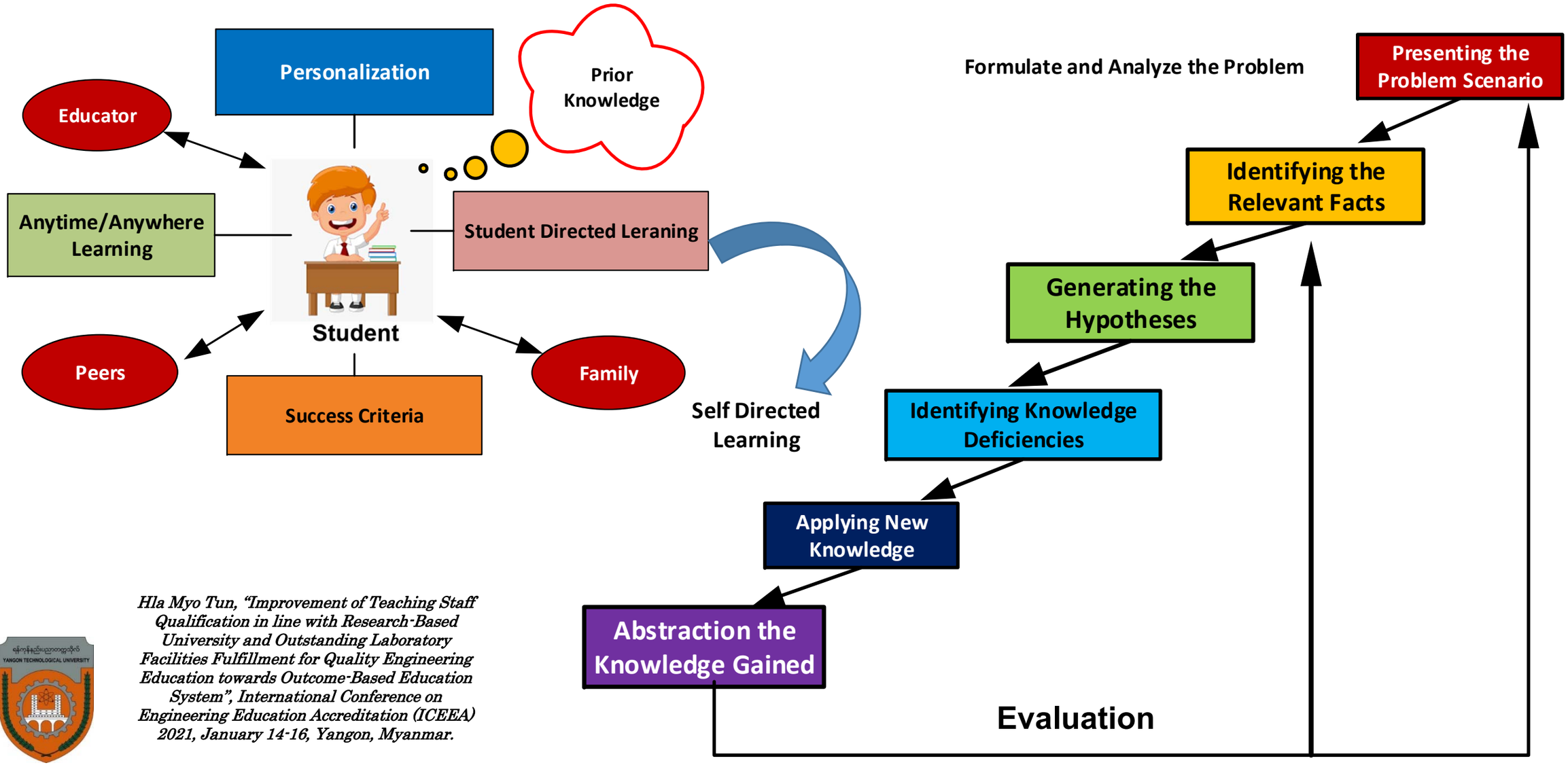
- Measurable, observable statements of what students will be able to do and understand at the end of a course
- Outcomes and not activities
- COs should not include vague or immeasurable words
- In order to write course outcomes, we need associated verbs or words that pertain to each level of Bloom's Taxonomy

Lesson Planning and Effective Teaching Method



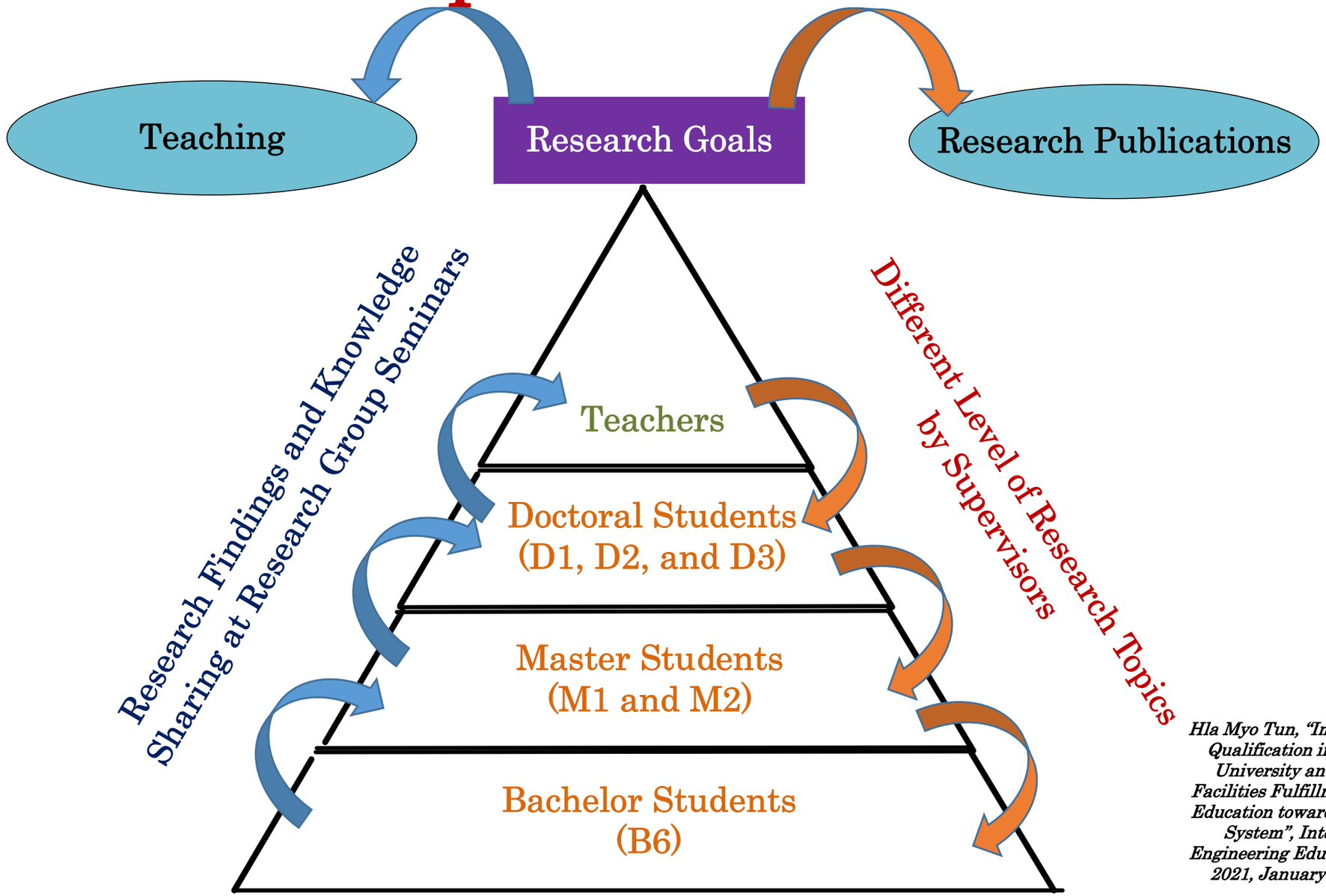


Student-Centered Approach and Problem-Based Learning for OBE



Hla Myo Tun, "Improvement of Teaching Staff Qualification in line with Research-Based University and Outstanding Laboratory Facilities Fulfillment for Quality Engineering Education towards Outcome-Based Education System", International Conference on Engineering Education Accreditation (ICEEA) 2021, January 14-16, Yangon, Myanmar.

Research Group Activities at YTU

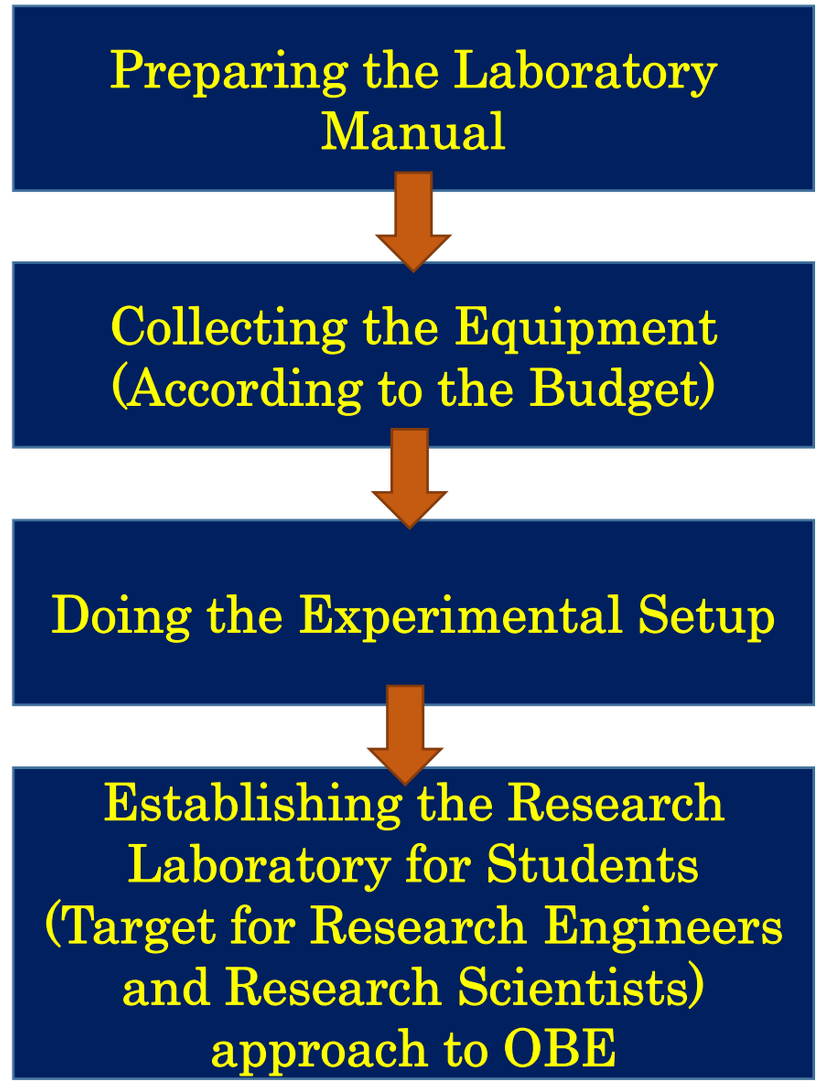


Hla Myo Tun, "Improvement of Teaching Staff Qualification in line with Research-Based University and Outstanding Laboratory Facilities Fulfillment for Quality Engineering Education towards Outcome-Based Education System", International Conference on Engineering Education Accreditation (ICEEA) 2021, January 14-16, Yangon, Myanmar.

Model for Fulfillment of Research Laboratory Equipment

Hla Myo Tun, "Improvement of Teaching Staff Qualification in line with Research-Based University and Outstanding Laboratory Facilities Fulfillment for Quality Engineering Education towards Outcome-Based Education System", International Conference on Engineering Education Accreditation (ICEEA) 2021, January 14-16, Yangon, Myanmar.

RBE → OBE



Some Lecture Notes from Research Outcomes

Crystal Growth and Characterization o
Undoped ZnO on m-plane Sapphire by Mi
CVD Technique with Different Carrier Ga
Flow Rates

Hla Myo Tun[a], Thant Zin Win[b], Kensuke Minamic, Satomi Terayac,
Tsuda Takaaki[c], Koushi Okita[c], Yusui Nakamura[c,d],
[a]Department of Electronic Eng
[b]Department of Electronic En
[c]Graduate School of Scien
[d]Kumamoto Inst

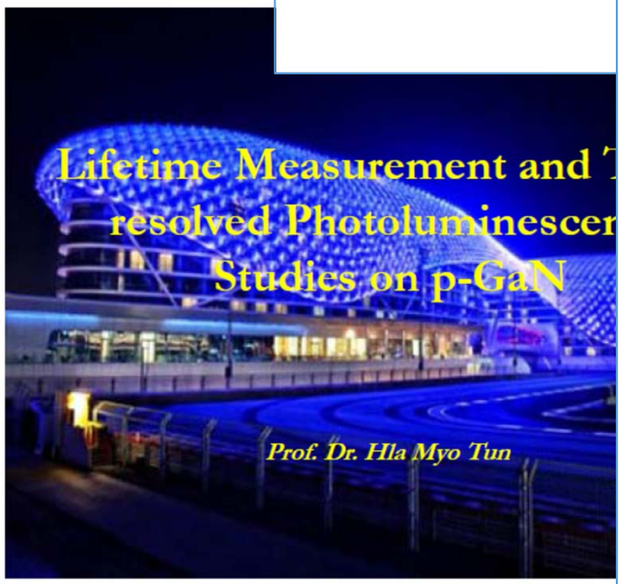
Electronic Transition Dynamics of Deep Levels i
p-GaN Film Analysed by Time-resolved PL
Measurements Using Two Excitation Laser Bean

Prof. Dr. Hla Myo Tun

YANGON TECHNOLOGICAL UNIVERSITY
ELECTRONIC ENGINEERING DEPARTMENT

Development of Band Layer Design and LI Analysis of heterojunction GaN/ZnO LEDs on Si Substrate

Prof. Dr. Hla Myo Tun



Fourier Transform Infrar
Measurement on GaInP/
Structure on GaAs Sul

Hla Myo Tun[*1,2], Hironori Sakamoto[~2], and Yosh
[1]Department of Electronic Engineering, Yangon Tech
Gyogone, Insein PO, 11011, Yangon Region, Republic of
[2]Department Electrical and Electronic Engineering, Gradu
Chiba University, 1-33 Yayoicho, Inage-ku, Chiba,

YANGON TECHNOLOGICAL UNIVERSITY
ELECTRONIC ENGINEERING DEPARTMENT

Luminescence Intensity Analysis of p-GaN/n-MgZnO LEDs

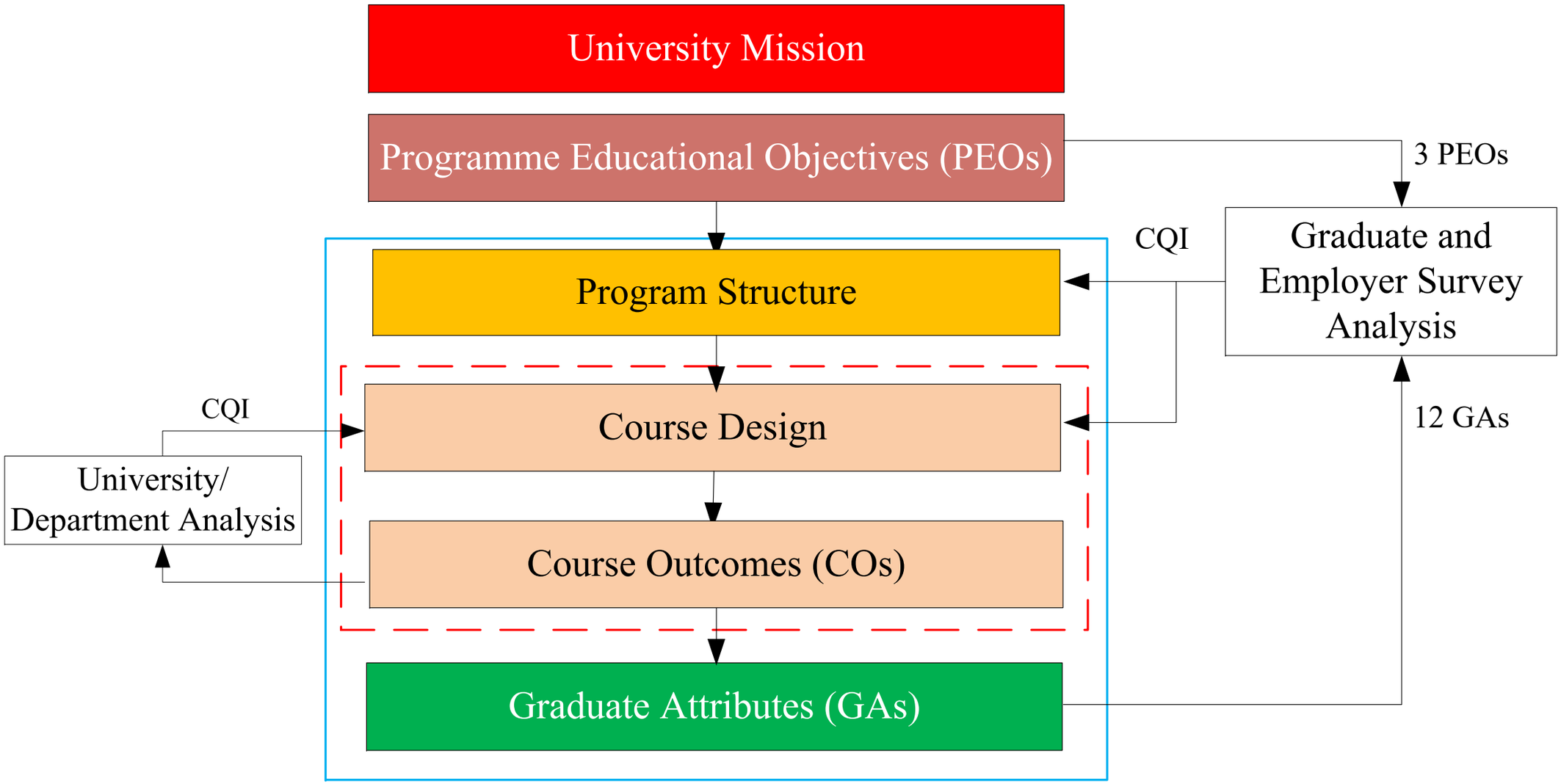
Prof. Dr. Hla Myo Tun

1

Outcome–based Assessment

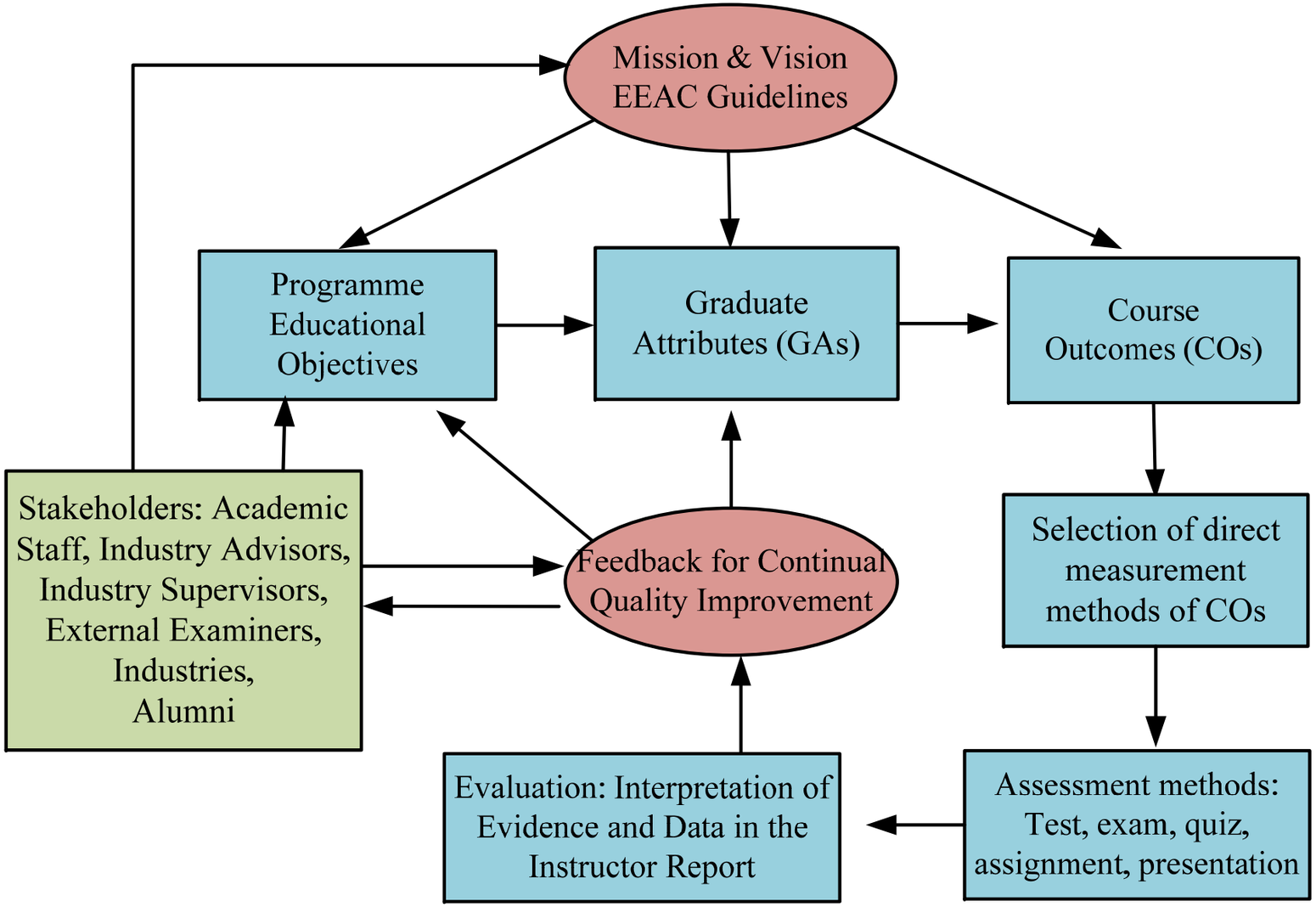
Implementation strategic	Assessment Strategy	Data Source/Assessment Instrument
Industrial project - improve student competence in communication, teamwork, and project management	Exams, Interview, Survey, observe, assess skill level, monitor development of skills	Reports, interview schedule, survey, observation records, grades of exams and projects, exit skill checklist
Design course - address industry needs	Assessment criteria from literature, by industry, and lecturers	List of assessment criteria, observation reports, interview, students evaluation, exams, exit skill checklist

Continuous Quality Improvement (CQI)[1]

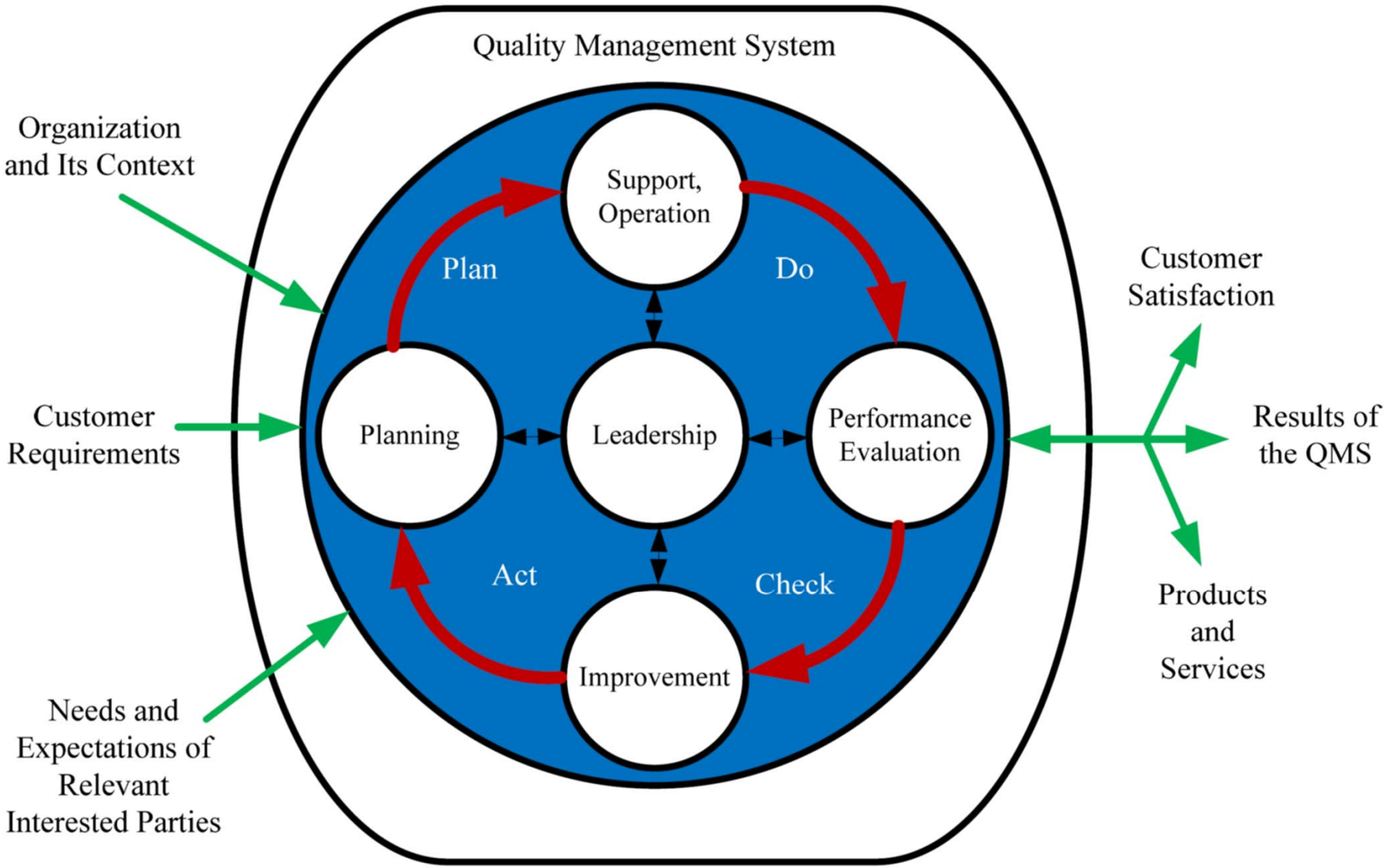


[1] Prof. ELiathamby Ambikairajah, School of EE&T, UNSW, Sydney

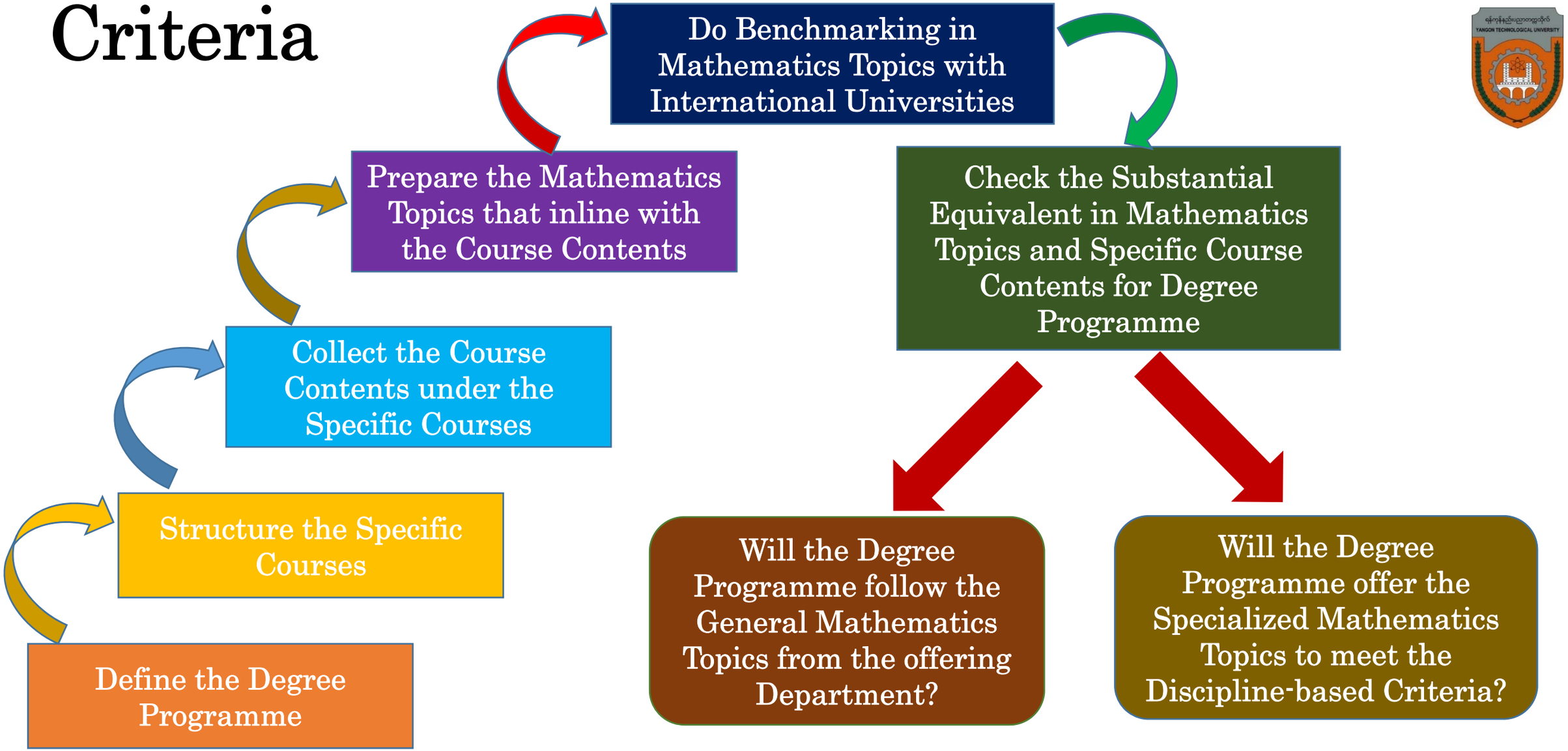
Framework for Graduate Attributes Achievement and Revision



Quality Management System Implementation for OBE



Model for Formulation of Discipline Based Criteria



Hla Myo Tun, "Formulation of Discipline Based Criteria for Electronic Engineering Programme through Mathematics Topics to Implement the Outcome Based Education System at Yangon Technological University", International Conference on Engineering Education Accreditation 2023 (ICEEA 2023 Myanmar), 27th July to 28th July 2023.

Discussion Points

- To improve the qualification of teaching staff in a research university, the four skills in the 21st Century Skills with ***collaboration, communication, creativity and critical thinking*** shall have to be occupied.
- According to the discussions on some model for improvement of qualified teaching staffs in a research university for OBE system, YTU staffs follow the development idea and experience based on several research activities.
- According to the analysis model for developing the students' activities for teaching and research works, some outstanding students had published their research outcomes.
- The qualified teaching staffs or researchers or research teachers are very important to establish the outstanding research facilities based on their research experience and experimental studies for all students and societies.

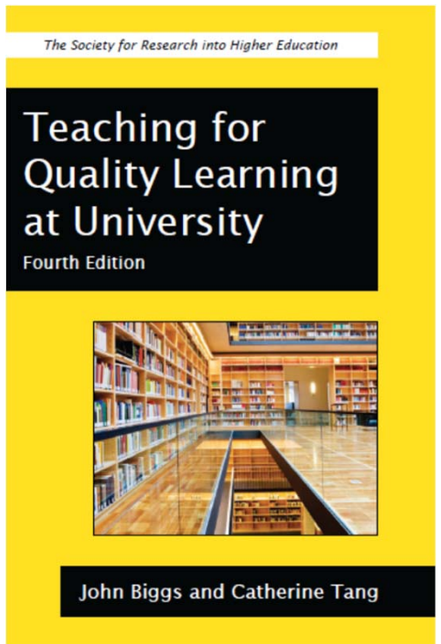
Discussion Points (Continued.,)

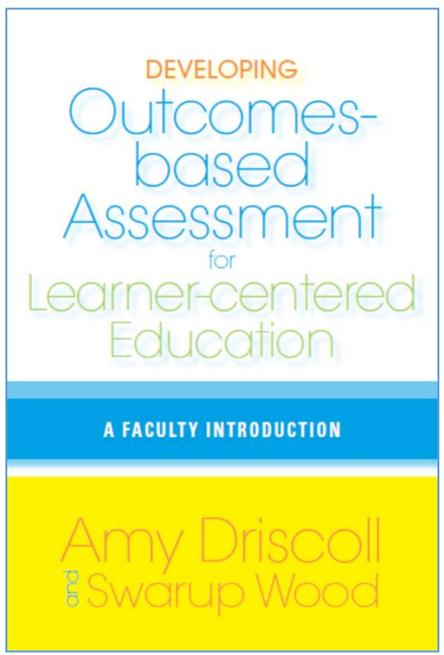
- The clear course outcomes shall be utilized for implementing the Outcome-based Education (OBE) system.
- Designing a course by using Bloom's Taxonomy with specific case study is clearly understanding on the teaching and learning process for the students.
- The course outcomes mapping for specific course will be utilized for good assessment system.
- The CQI process is compulsory for closing the loop in the OBE system.
- The Quality Management System (QMS) is the catalyst for OBE under the Accreditation Process.
- The Discipline-based Criteria is the crucial criteria for the Accreditation Process.

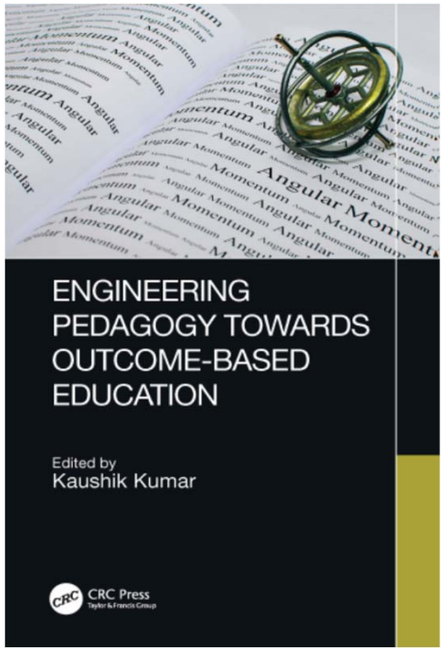
Conclusion

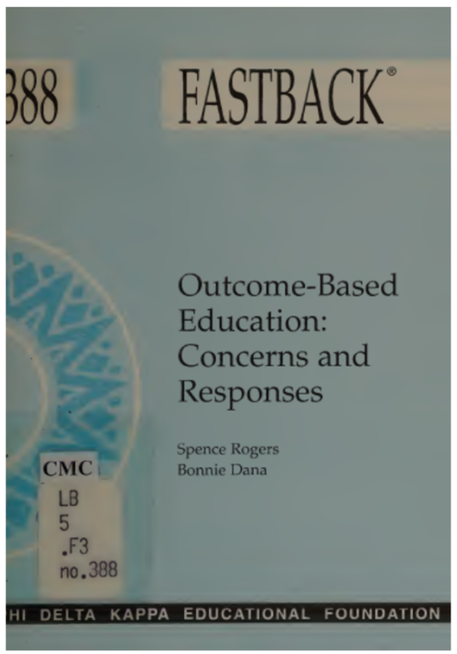
- RBE-based OBE system directly reflects the Sustainable Development Goals to enhance the Engineering Education.
- The fulfillment of outstanding research laboratory and equipment for research purposes could be provided to enhance the quality engineering education at YTU according to the formulation of level of education purposes like mechanic level, technician level, engineering level and scientist level and it is important to create the best research university.
- After changing the teaching methods like PODS at YTU, the outcomes of engineering education level and research achievements could be observed.
- The demand for engineering professional skills is likely to be higher than ever before in order to convey sustainable engineering researches, low-carbon energy technologies, and robust physical infrastructure to protect against geophysical hazards such as sea-level rise and extreme meteorological events.

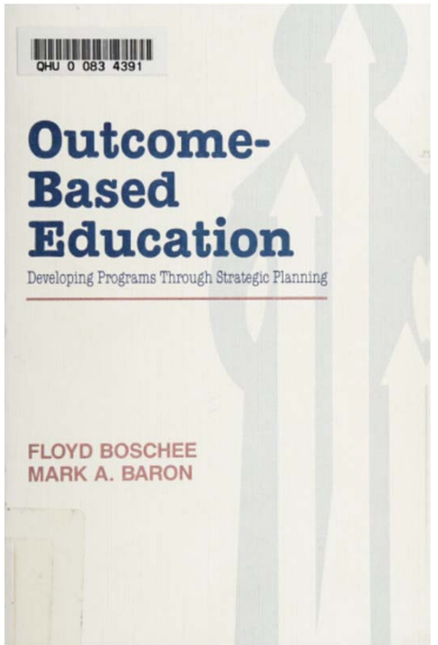
Recommended Books

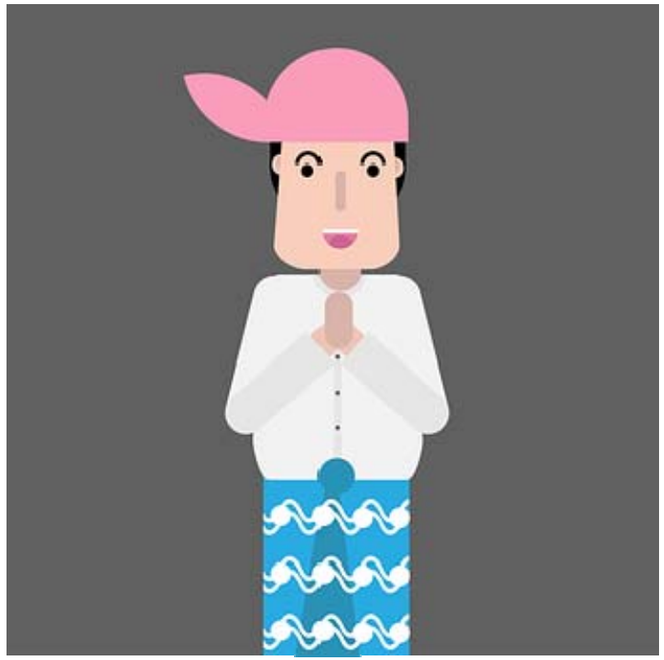












Thank You Very Much for Your Attention